



DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
WASHINGTON, DC 20350-2000

IN REPLY REFER TO
OPNAVINST 2450.2
OP-941F

08 JAN 1990

OPNAV INSTRUCTION 2450.2

From: Chief of Naval Operations

Subj: ELECTROMAGNETIC COMPATIBILITY PROGRAM WITHIN THE DEPARTMENT
OF THE NAVY

Ref: (a) DOD Directive 3222.3 of 5 Jul 67 (NOTAL)
(b) DOD Directive C3222.5 of 22 Apr 87 (NOTAL)
(c) OPNAVINST C2450.1 (NOTAL)
(d) SECNAVINST 2410.1B (NOTAL)
(e) CNO ltr Ser 09/9U500833 of 17 Mar 89 (NOTAL)
(f) MIL-STD-480B (NOTAL)
(g) OPNAVINST 2400.20E (NOTAL)
(h) OPNAVINST 5000.42C (NOTAL)
(i) OPNAVINST 3960.10C (NOTAL)
(j) OPNAVINST 5000.49A (NOTAL)
(k) MIL-HDBK 237A (NOTAL)
(l) NTP 70-8003 (NOTAL)
(m) MCO 2400.2 (NOTAL)
(n) MCO 2410.2 (NOTAL)

1. Purpose. To assign responsibilities for electromagnetic compatibility (EMC) within the Department of the Navy (DON) in consonance with the policy established by the Secretary of the Navy and with the reorganization of headquarters activities and to renumber the instructions following current Standard Subject Identification Codes.

2. Cancellation. OPNAVINST 2410.31D

3. Scope. This instruction addresses Chief of Naval Operations (CNO), Commandant of the Marine Corps (CMC), Naval Systems Commands (SYSCOM), and Fleet, Force, and Type Commander responsibilities to achieve EMC in all electrical and electronic equipment, subsystems, systems, platforms, and facilities developed, procured, operated, and maintained by the DON.

4. Background

a. Reference (a) established an integrated Department of Defense (DOD) Electromagnetic Compatibility Program and assigned responsibilities to DOD components. The Secretary of the Navy is assigned lead responsibility for standards and specifications in the area of EMC.

0579LD0548830



08 JAN 1990

b. Reference (b) expands the EMC program to include U.S. Signals Intelligence (SIGINT) sites. Reference (c) implements the DON EMC Management Program for SIGINT Sites.

c. Reference (d) implements reference (a) within the Navy and designates CNO as the executive for EMC within DON.

5. Department of the Navy Policy

a. Achievement of compatibility in the operational electromagnetic environment is the paramount objective of the Navy EMC program. The Strategic Plan for Electromagnetic Environment Management, reference (e), provides Navy policy guidance and programmatic actions to enhance EMC at all levels.

b. Each command, activity, project or program office, laboratory, and facility within DON is accountable individually for the application and enforcement of EMC requirements and for the achievement of EMC within its respective area of responsibility.

c. EMC shall be emphasized during the research, development, and acquisition (RDA) and modification processes to minimize the need to correct deficiencies after production. EMC shall be reflected in Tentative Operational Requirements (TOR), Development Option Papers (DOP), Operational Requirements (OR), Test and Evaluation Master Plans (TEMP), and Acquisition Plans (AP). EMC practices shall be applied in the operation of electronic/electrical systems. Waivers of EMC requirements shall be approved only after due consideration of the impact on operational capability.

d. In satisfying requirements for EMC analysis and prediction, and in consonance with references (a) and (d), the facilities of the DOD Electromagnetic Compatibility Analysis Center (ECAC) shall be used to the maximum practical extent and shall not be unnecessarily duplicated.

6. Definitions

a. Electromagnetic Compatibility (EMC). The ability of electronic/electrical equipment, subsystems, and systems to operate in their intended operational environments without suffering or causing unacceptable degradation because of electromagnetic radiation or response.

b. Electromagnetic Interference (EMI). Any electromagnetic disturbance that interrupts, obstructs, or otherwise degrades or limits the effective performance of electronics/electrical equipment. It can be induced intentionally, as in some forms of electronic warfare, or unintentionally, as a result of spurious emissions and responses, intermodulation products, and the like.

08 JAN 1969

c. Waiver. As used in this instruction, a formal written authorization removing or altering certain EMC requirements for an equipment, system, or platform. Requests for waiver of EMC requirements could result from engineering change proposals, deviations, or waivers, as defined in reference (f).

d. EMC terms are defined in the cited references and in Joint Chiefs of Staff (JCS) Pub 1.

7. EMC Relationships

a. Good radio frequency spectrum management is a prerequisite for EMC. Reference (g) provides policy for assuring spectrum supportability of new equipment and systems.

b. EMC is an engineering specialty which must be integrated into all engineering programs involving the design, test, use, and modification of electronic/electrical equipment and systems.

c. Responsibilities for the Navy portion of the North Atlantic Treaty Organization and joint EMC related programs are assigned in separate documents.

d. EMC is one element of Electromagnetic Environmental Effects (E³) control. E³ also includes electronic counter-countermeasures (ECCM), radiation hazards (RADHAZ), electromagnetic pulse (EMP), radio frequency spectrum management, and natural effects (e.g. lightning). ECCM, EMP, and RADHAZ are related but separate programs. The EMC Program should augment, be used by, and, to the maximum extent practical, be integrated with these programs. As a minimum, equipment and systems developed to meet the special requirements of these programs shall also meet all applicable EMC standards for conventional electronic/electrical equipment and systems.

e. EMI results from inadequate EMC. EMI control is an integral component of EMC.

8. Responsibilities

a. The Director of Space, Command, and Control, OP-094 shall:

(1) As EMC Program Coordinator, provide policy guidance, management direction, resource assessment, and coordination for the Navy EMC program, and:

(a) Participate as principal EMC advocate on the WRB.

(b) Sponsor the development and maintenance of a capability to monitor compliance with EMC related requirements in the acquisition process and to assist the Office of the Chief of

08 JAN 1990

Naval Operations resource sponsors in assessing the impact of EMI degradation on force level combat posture and in monitoring correction of EMC deficiencies.

(c) Provide Navy representation in joint, national, and international EMC related meetings/programs. Ensure foreign EMC technology, data, and practices are considered for applicability for Navy use and assessed for impact on Navy operations.

(d) Rule on requests for waiver of EMC requirements, referring, with recommendations, for WRB ruling those requests for waivers which impact force level readiness. Make recommendations to the WRB chairman to deal with instances of predicted interference referred by the Commander, Space and Naval Warfare Systems Command (COMSPAWARSYSCOM) and with corrections of EMI deficiencies which degrade force level warfighting capability. Provide recommendations to resource sponsors on waiver requests which impact only cognizant platform or facility performance. Advise sponsors of victim systems on options to avoid interference degradation of warfighting capability.

(2) Provide EMC guidance for all DON RDA and modifications of systems.

(3) Sponsor and assure the funding for the prevention and correction of EMC related deficiencies which degrade the mission and combat effectiveness of systems, platforms, and facilities for which responsible and for cross-mission area efforts.

b. The Deputy CNO or Chairperson (Naval Warfare), OP-07, shall:

(1) As Chairman of the Warfare Requirements Board (WRB): exercise oversight of the implementation of the Electromagnetic Environment Management Strategic Plan, distributed by reference (e); exercise authority for waiver of EMC requirements which impact force-level readiness; ensure adequate addressal of EMC related concerns during milestone reviews; coordinate resolution of EMC related issues referred by OP-094; and alert CNO to EMC related problems degrading force level warfighting capacity.

(2) Ensure that TOR's and OR's require that system performance requirements are established and met while operating in the electromagnetic environment of the system's intended use and that operation of the system will not degrade the performance of other platforms or force level systems.

(3) Assess EMC resources in the Planning, Programming and Budgeting System (PPBS) and Selected Acquisition Report (SAR) appraisal process to ensure that project funding is adequate to accomplish EMC in warfare systems.

● 8 JAN 1990

(4) Advise the fleet on operational measures and tactics which should be used to exploit the electromagnetic environment and to control EMI degradation of warfighting ability.

c. The Director of Research and Development Requirements, Test and Evaluation, OP-098, shall provide appropriate sponsorship and policy direction for including EMC in requirements documentation and TEMP's, per references (h) and (i), and shall:

(1) Ensure that EMC is a discussion item during Navy Planning Decision Meetings (NPDM), and in TOR's, DOP's, OR's, and TEMP's for electronic/electrical equipment and systems.

(2) Ensure that service tests and evaluations of electronic/electrical equipment and systems are conducted to ascertain EMC in typical operational environments.

d. The Deputy Chief of Naval Operations (Navy Program Planning), OP-08, shall ensure that resource sponsors have programmed and claimants have budgeted for EMC management and EMI degradation control and for corrections consistent with OP-02/03/04/05/07/094 assessments and project milestone reviews and with current fiscal guidance. He shall also monitor execution to prevent unwarranted migration of programmed EMC funding.

e. The Deputy Chief of Naval Operations (Manpower, Personnel, and Training), OP-01, shall ensure that Navy training and manning goals for EMC are established and achieved.

f. The Assistant Chiefs of Naval Operations (ACNO) for Undersea Warfare, OP-02, Surface Warfare, OP-03 and Air Warfare, OP-05, shall:

(1) Assure that EMC is required, funded, and incorporated in systems, platforms, and facilities for which responsible.

(2) Rule on requests for waiver of EMC related requirements referred by the EMC Program Coordinator which affect systems, platforms, or facilities for which responsible.

(3) Sponsor the identification and correction of EMI problems in systems, platforms, and facilities for which responsible.

(4) Exercise approval authority for:

(a) The operational impact of proposed corrections of EMI problems.

(b) The acceptance of operational degradation for EMI problems which cannot be corrected within current capabilities or resources.

08 JAN 1990

(5) Ensure "life cycle" EMC planning and support for all new systems, platforms, and facilities for which responsible. Require all integrated logistic support (ILS) elements needed for EMC support per reference (j) to be available in time for fleet introduction.

(6) Program funds and manpower to ensure training and use of fleet personnel in EMC management and EMI control.

(7) Maintain a central point of contact for all EMC and EMI control matters within each ACNO organization.

g. The Deputy Chief of Naval Operations (Logistics), OP-04, shall:

(1) Sponsor a centralized EMC maintenance program for Navy ships and submarines to eliminate duplication of EMC programs among ACNOs. Assess funding for the correction of EMC deficiencies in Navy ships, submarines, aircraft and shore activities.

(2) Ensure, per reference (j), that logistic support programs are developed to meet operational suitability and EMC program thresholds (EMC technical data, training support, and spare parts) upon fleet introduction.

h. The Naval Inspector General, OP-09G, in the course of command and administrative inspections, shall include EMC as a topic to check compliance with the provisions of reference (g), of this, and of derivative instructions, especially in procurement contract documentation.

i. The Chief of Naval Education and Training (CNET) shall:

(1) Ensure the inclusion of EMC/EMI control requirements in the appropriate follow-on training involving electronic/electrical equipment and systems.

(2) Implement training material developed per reference (1) for applicable CNET sponsored courses.

(3) Assist Fleet Commanders in Chief and Force and Type Commanders in incorporating EMC/EMI control into their training programs.

j. The Commanders of Naval System Commands (including Commander of Naval Facilities Engineering Command) shall ensure spectrum supportability and EMC of equipment, systems, platforms and facilities for which they have responsibility for material acquisition and life cycle support, and shall establish and maintain the engineering capability for detecting, measuring and analyzing, reporting, and correcting EMI deficiencies. In so doing, each commander shall:

8 JAN 1990

(1) Review and monitor command RDA documents in terms of spectrum support and EMC impact on combat operations. Inform the resource sponsor and OP-07, via the EMC Program Coordinator, with copy to COMSPAWARSYSCOM, of instances of predicted EMC problems with new systems, identifying both the source and the victim systems, and the effect on operations.

(2) Prepare EMC Program Plans following reference (k) for acquisition category (ACAT) I and II equipment, systems, and platforms being developed that may affect, or be affected by, their operational electromagnetic environments and for ACAT III and IV equipment and systems selected by the WRB.

(3) Establish EMC Advisory Boards (EMCAB) for all ACAT I and II programs (and other programs designated by the WRB).

(4) Conduct a thorough EMC analysis of proposed new developments or of new applications of existing developments prior to a Milestone II decision to enter full scale engineering development. The analysis shall be updated for succeeding decision milestones and follow on procurements. Subject nondevelopment items (NDI) proposed for procurement to a thorough EMC analysis in the proposed operational electromagnetic environment prior to major procurement decisions, and limit initial procurement quantities to the minimum necessary for test and evaluation to certify EMC.

(5) Exercise waiver authority for EMC related requirements for variances which do not impact warfighting capability. Otherwise, submit waiver requests, with impact analyses, to the EMC Program Coordinator for approval via COMSPAWARSYSCOM for evaluation of the impact on force level effectiveness. Ensure waiver response letters are recorded in the command data base and are included as essential documents in the contracts file, subject to review by the Naval Inspector General.

(6) Coordinate with other SYSCOMS and project managers to resolve and correct mutual EMC deficiencies.

(7) Ensure that command data bases contain current and accurate information on the status of EMC related requirements for cognizant programs. The data bases should be centrally accessible for periodic oversight review and should include information concerning:

(a) Compliance with EMC related requirements in acquisitions.

(b) Documented approval of waivers of, and deviations from, EMC related requirements associated with acquisitions.

(c) Status of correction of EMC deficiencies in the fleet, including projected completion dates.

08 JAN 1990

(8) Prepare, maintain and execute a SYSCOM Implementation Plan for reference (e), updating it biennially.

(9) Develop and issue, publish, or provide for respective areas of responsibility, definitions of the electromagnetic environment consistent with the COMSPAWARSYSCOM definition of the force wide electromagnetic environment. Develop and promulgate standards, specifications, data item descriptions (DID), and handbooks for achievement and maintenance of EMC in cognizant systems, platforms, and facilities, consistent with the DOD EMC standards program.

(10) Establish EMC related training requirements for management, engineering, operations, and maintenance personnel associated with cognizant systems, platforms, and facilities, and incorporate them into reference (1).

(11) Ensure that personnel assigned to EMC related engineering duties at headquarters or subordinate activities receive adequate training and certification of skill to detect, measure, analyze, report, and correct EMI degradation of cognizant systems, platforms, or facilities.

(12) Provide quick response to correct EMI degradation reported by the fleet or shore facilities involving equipment, systems, and facilities for which responsible.

(13) Establish EMC related support programs per the requirements of ILS elements (EMC technical data, training, and training support) required for operation and maintenance which must be planned for and funded to be available by fleet introduction.

(14) Establish and provide a representative to a staff level EMC Coordinating Committee sponsored by the EMC Program Coordinator. The committee shall meet at the call of the chairperson, at least quarterly, to review mutual projects and issues, to coordinate the resolution and correction of mutual EMC deficiencies, and to provide a semiannual status report to the WRB.

k. The Commander, Space and Naval Warfare System Command, in addition to those responsibilities assigned in paragraph 8j, shall:

(1) Be the focal point in the Systems Commands for engineering interfaces and interdependencies related to force level EMC and shall:

(a) Develop a capability to quantify the impact of EMI degradation on force level warfighting capability.

(b) Review RDA documents for equipment, systems, and platforms, per reference (h), in terms of impact of electromagnetic spectrum support and EMC on force level operations. Alert OP-07,

08 JAN 1990

via the EMC Program Coordinator, of predicted mission degrading EMI with new systems, identifying both the source and the victim systems. Alert OP-098, via the EMC Program Coordinator, of limitations and deficiencies noted in TEMP statements on operational suitability in the electromagnetic environment and the criteria to be used in assessments.

(c) Review and provide technical recommendations to the EMC Program Coordinator on requests for frequency allocation and for waiver of EMC related requirements.

(2) As Lead Service Activity for the EMC Standardization Area under the Defense Standardization and Specification Program, develop and maintain in accordance with reference (a), a coordinated plan to provide current and contractually enforceable EMC military standards.

(3) Coordinate and program funds for the development and updating of EMC dedicated engineering standards, specifications, and handbooks.

(4) Provide related staff support to the EMC Program Coordinator.

1. The Commander, Naval Sea Systems Command, in addition to those responsibilities assigned in paragraph 8j, shall maintain for the EMC Program Coordinator the Navy Training Plan for EMI Control, reference (i), and shall serve as the Principal Development Agent (PDA) for training material for Navy schools and courses.

m. The Commandant of the Marine Corps is responsible for attaining EMC Program objectives outlined in reference (a) and this instruction, and for ensuring compliance with the directives and assignment of responsibilities identified in reference (m) and (n). The CMC will:

(1) Specify EMC requirements for telecommunications equipments and systems during initial application for frequency allocation, per reference (m).

(2) Publish information concerning the Marine Corps Electromagnetic Environmental Effects (E³) Control Program and accomplish the objectives of this program, as set forth by reference (n).

(3) Ensure that EMC is achieved in the design, installation, and operation of Marine Corps telecommunication/electrical equipment.

08 JAN 1990

n. The Chief of Naval Research, in coordination with the EMC Program Coordinator, shall plan and program to advance the technology base for effective prediction of the electromagnetic environment and for detection, prevention, control, and correction of EMC related deficiencies.

o. Commanders in Chief and Force and Type Commanders shall promote EMC/EMI control in the fleet by:

(1) Making full use of available training for assigned personnel.

(2) Assuring that system, equipment, and platform maintenance is performed under published EMI control procedures.

(3) Coordinating with the SYSCOMS in identifying, solving, and correcting operational EMI deficiencies.

(4) Developing and documenting tactics which take into account constraints imposed by electromagnetic degradation of equipment.

(5) Incorporating EMC into programs such as zone inspections and casualty reports (CASREPS).

p. The President of the Naval Board of Inspection and Survey (INSURV) shall include EMC and EMI control in all investigations and reports and shall include a status of EMC/EMI control findings in the scheduled reports of INSURV inspections to the CNO Executive Board (CEB).

9. Reports. The reports required by paragraphs 8j(6) and 8j(16) are exempt from reports control by SECNAVINST 5214.2B

10. Form. DD Form 1494(2-87), S/N 0102-LF-001-4941, is available in the Navy supply system per NAVSUP P-2002.


JERRY O. TUTTLE
By direction

08 JAN 1990

Distribution:

SNDL A1 (Immediate Office of the Secretary) (ASSTSECNAV MRA and ASSTSECNAV RES only)
 A2A (Department of the Navy Staff offices) (Chief of Naval Research only)
 A6 (Headquarters US Marine Corps) (15)
 B2C (Western Area Frequency Coordinator)
 21A (Fleet Commanders in Chief)
 22A (Fleet Commanders)
 23 (Force Commanders)
 24 (Type Commanders) (Less 24J, Fleet Marine Force Commands)
 26F (Operational Test and Evaluation Force and Detachment)
 26S (Mobile Technical Unit)
 C3A (To Navy Personnel at DOD or other Government Agencies) (Navy Deputy Director and Marine Corps Deputy Director, Electromagnetic Compatibility Analysis Center, only)
 C58 (CNET Shore Based Detachments)
 FE1 (Security Group Headquarters)
 FF1 (Naval District, Washington, DC)
 FF8 (Inspection and Survey Board)
 FF38 (Naval Academy)
 FF42 (Scol Postgraduate)
 FF6 (Observatory, U.S. Naval)
 FG1 (Telecommunications Command Headquarters)
 FH1 (Chief Bureau of Medicine and Surgery)
 FKA1 (SYSTEMS COMMANDS)
 FKA8 (Activities under the Command of DIRSSP as delegated by the CNO)
 FT1 (Chief of Naval Education and Training)
 FT2 (Chief of Naval Air Training)
 FT5 (Chief of Naval Technical Training)
 FT24 (Fleet Training Center) (Norfolk, VA only)
 FT54 (Scol Submarine)

Copy to:

SNDL C25A (OPNAV Support Activity Detachment) (Ft. Richie, only)
 FL1 (Data Automation Command)(Code 813, only)(20)
 OPS 09G, 01, 11, 02, 21, 22, 29, 03, 32, 35, 39, 04, 43, 05, 50, 51, 59, 07, 70, 71, 73, 74, 75, 76, 08, 80, 81, 82, 092, 094, 940, 941 (25), 943, 098, 980, 981, 982, 983
 Commandant of the Marine Corps (AREB) (2,050)
 US Army [SAIS-SM]
 USAF [AF/AQPT, SAF/AQQS]
 ASD/C³I

Stocked:

CO, NAVPUBFORMCEN
 5801 Tabor Avenue
 Philadelphia, PA 19120-5099 (100 copies)